

# La Parguera Sediment Budget

## February 2005 Update

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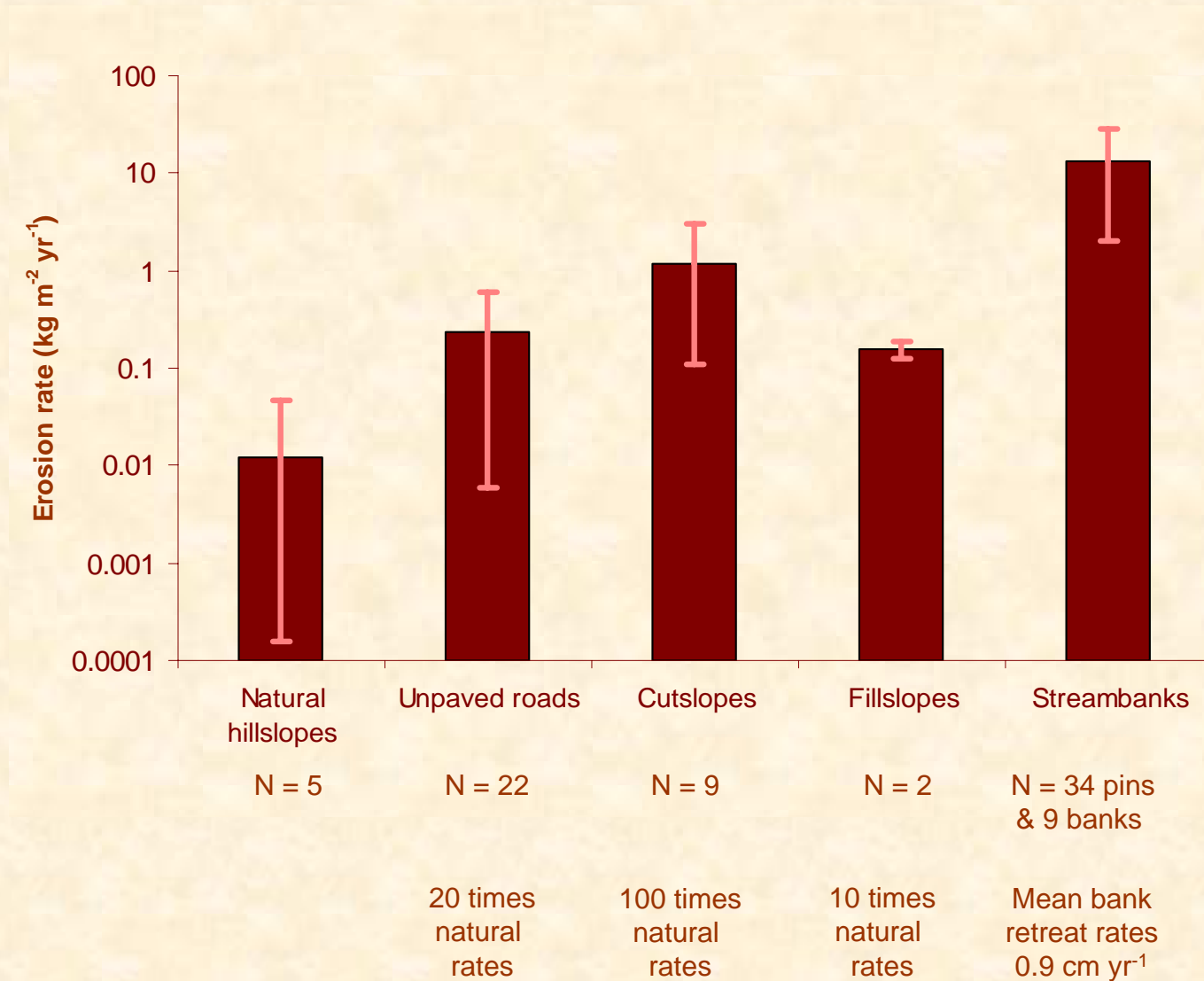
# Project objectives

1. Quantify and model sediment production from undisturbed hillslopes, unpaved roads, cutslopes, fillslopes, and streambanks.
2. Measure runoff response at the plot and watershed scales.
3. Estimate watershed-scale sediment yields.

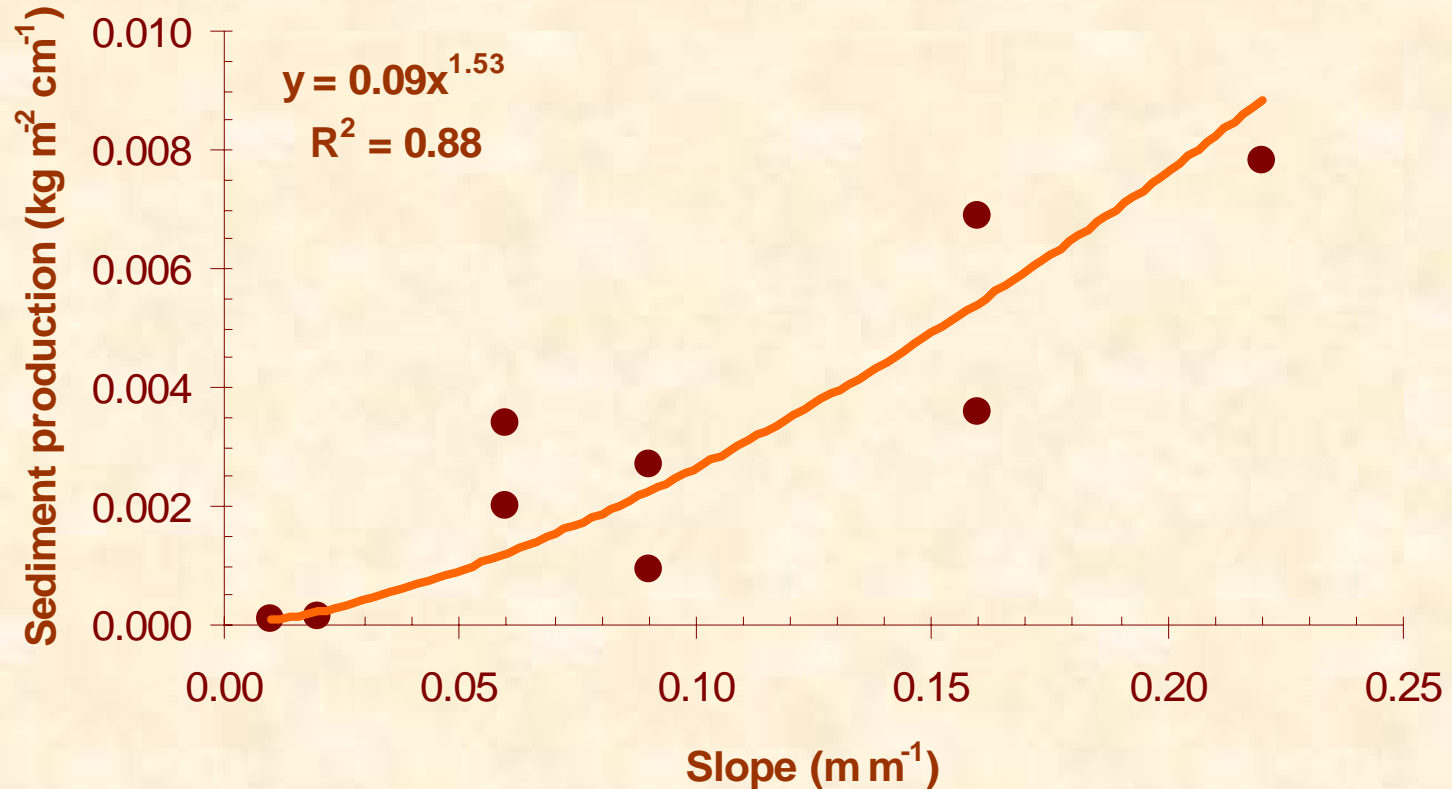
# Sediment production measurements (sediment traps)

Source	Study sites	Measurements
•Unpaved roads	10	53
•Cutslopes	11	35
•Fillslopes	3	9
•Undisturbed hillslopes	11	40
<b>TOTAL</b>	<b>35</b>	<b>137</b>

# Sediment production measurements

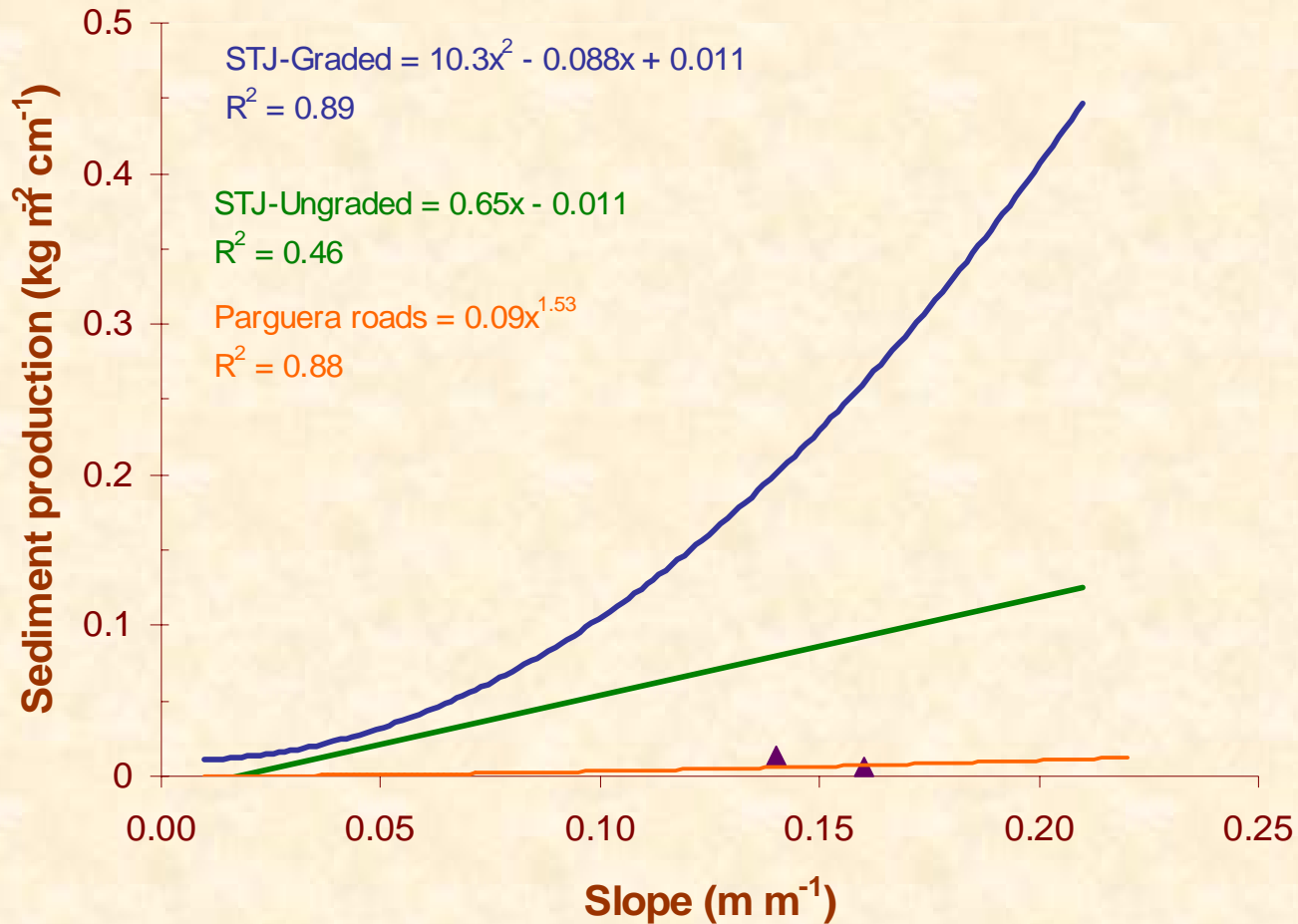


# Modeling sediment production from disturbed surfaces



9 road segments  
22 measurements

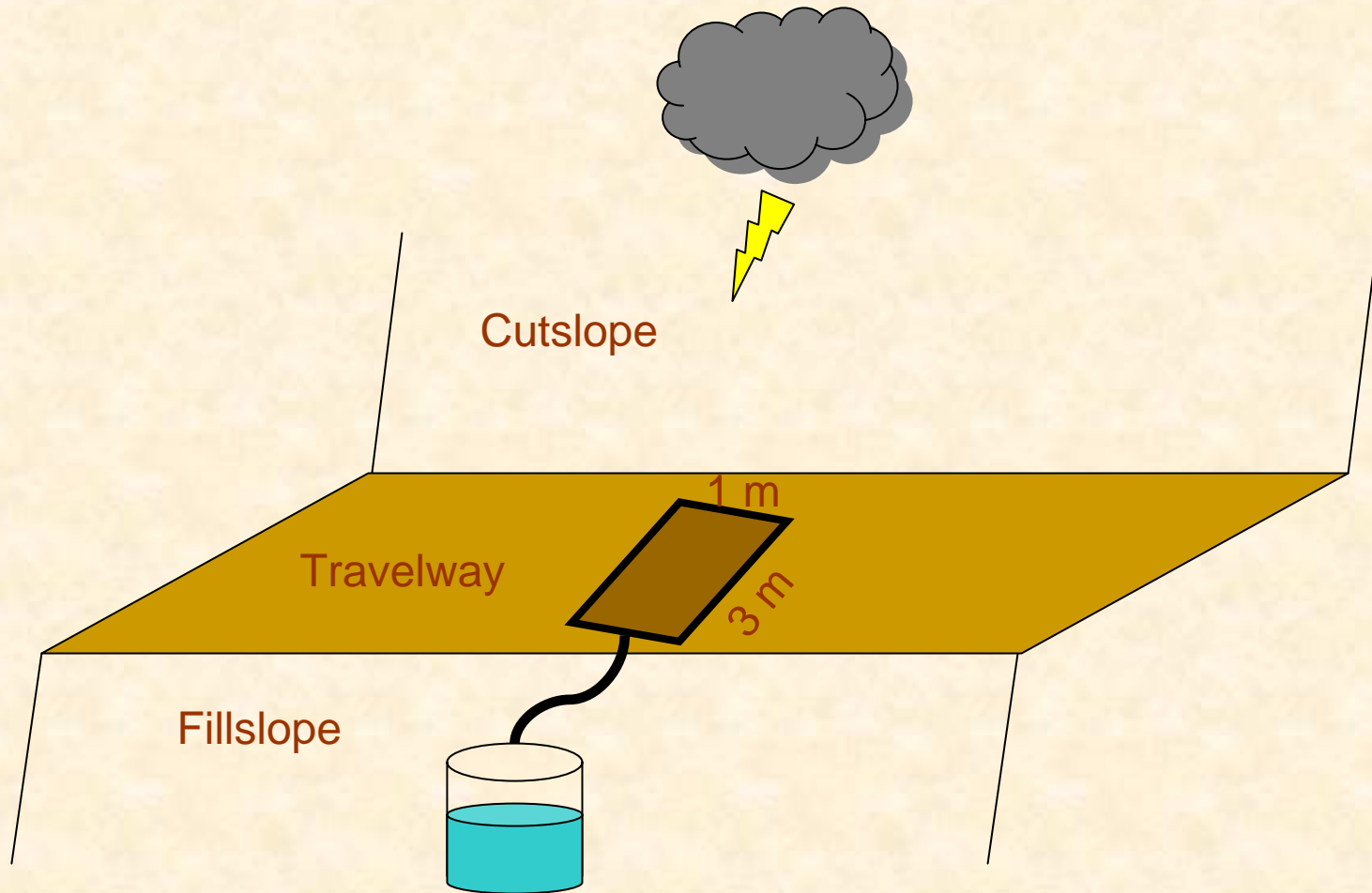
# Modeling sediment production from disturbed surfaces



# Preliminary conclusions on sediment production

- At the hillslope scale disturbed surfaces in Parguera have shown to increase sediment production rates one to two orders of magnitude above undisturbed hillslopes.
- Sediment production from disturbed surfaces depends on rainfall, slope, and presumably time since last disturbance.
- Sediment production rates from unpaved roads in Parguera are low relative to those previously measured in St. John, and this is due to the combination of older (coarser) eroding surfaces and lower precipitation intensities.

# Plot-scale runoff response measurements



# Plot-scale runoff response measurements



Road-Runoff-Plot 1



# Plot-scale runoff response measurements



## Freshly-disturbed surfaces

3 plots

Slopes: 9-14%

Surface:

fine material = 59-71%

coarse material = 29-41%

vegetation = 0%



## Undisturbed surfaces

4 plots

Slopes: 29-51%

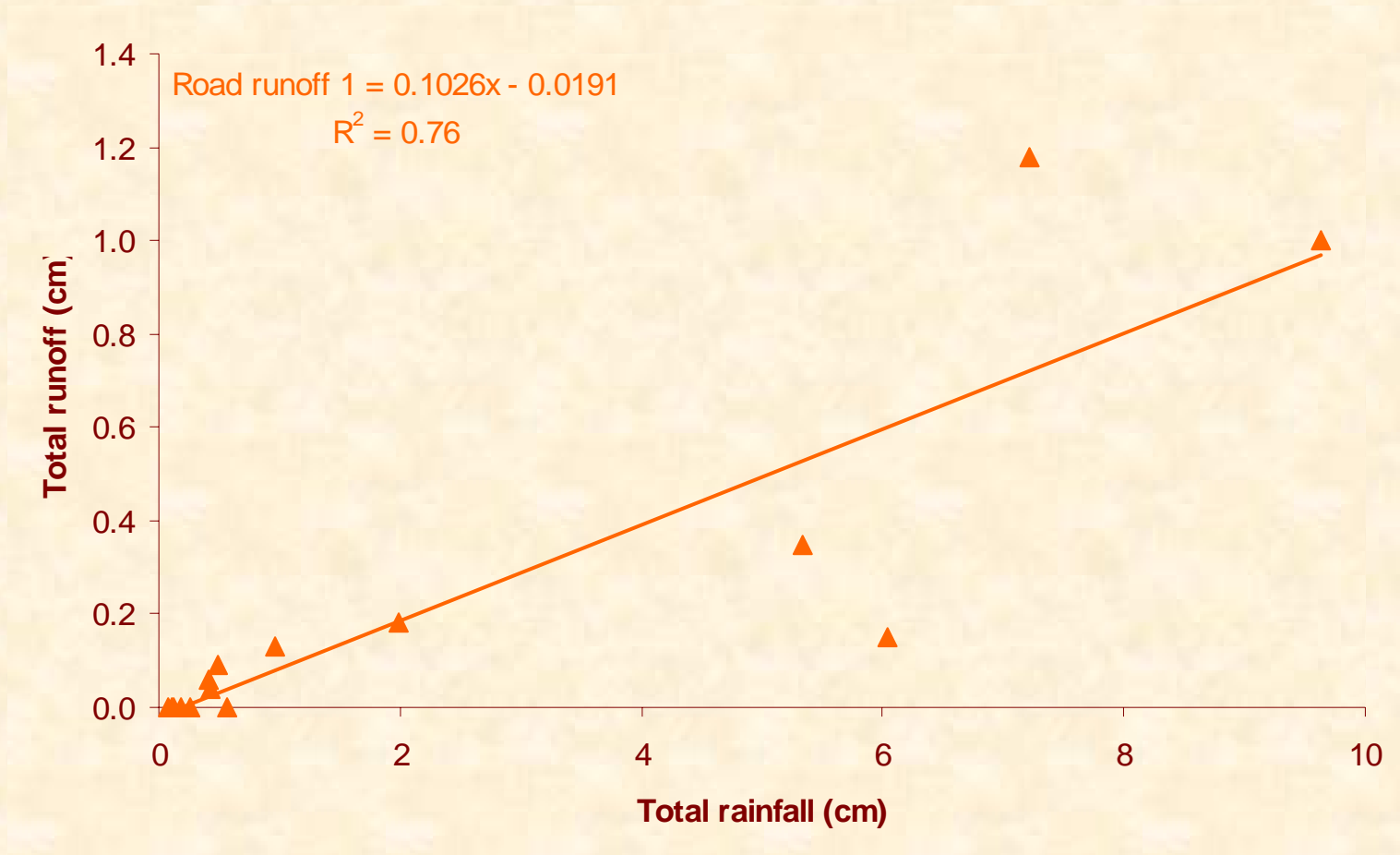
Surface:

fine material = 15-28%

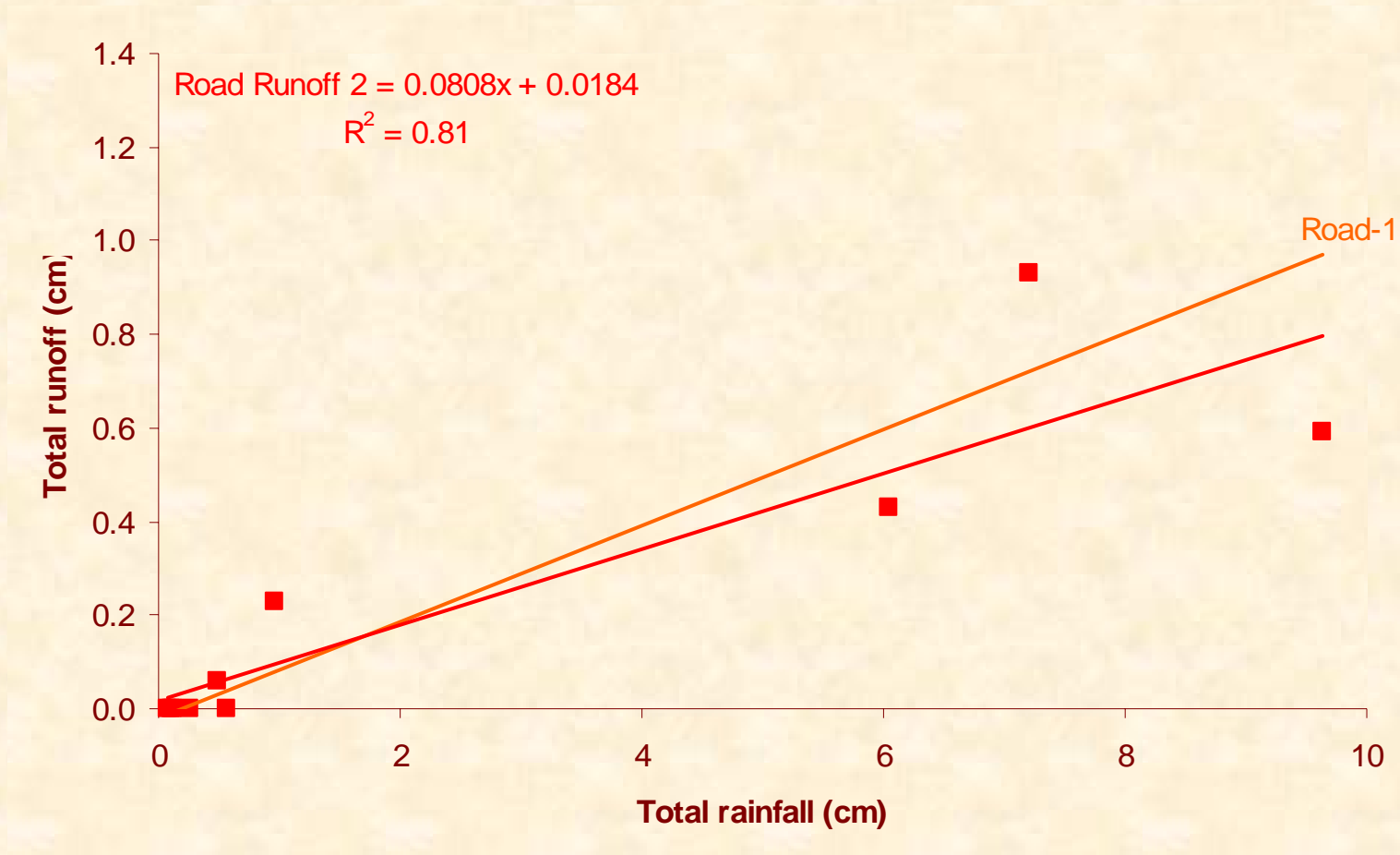
coarse material = 19-63%

vegetation = 22-61%

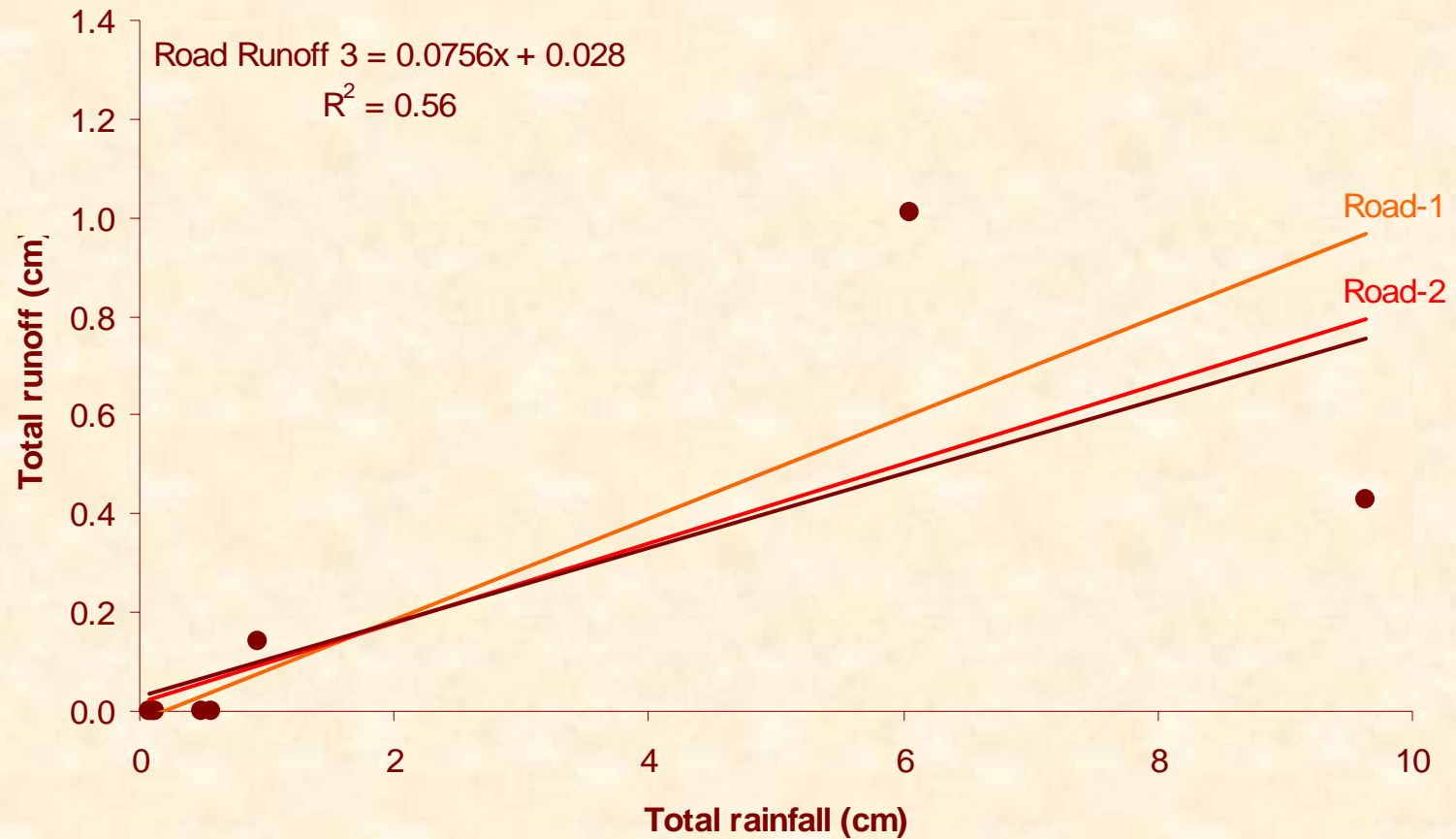
# Plot-scale runoff response measurements



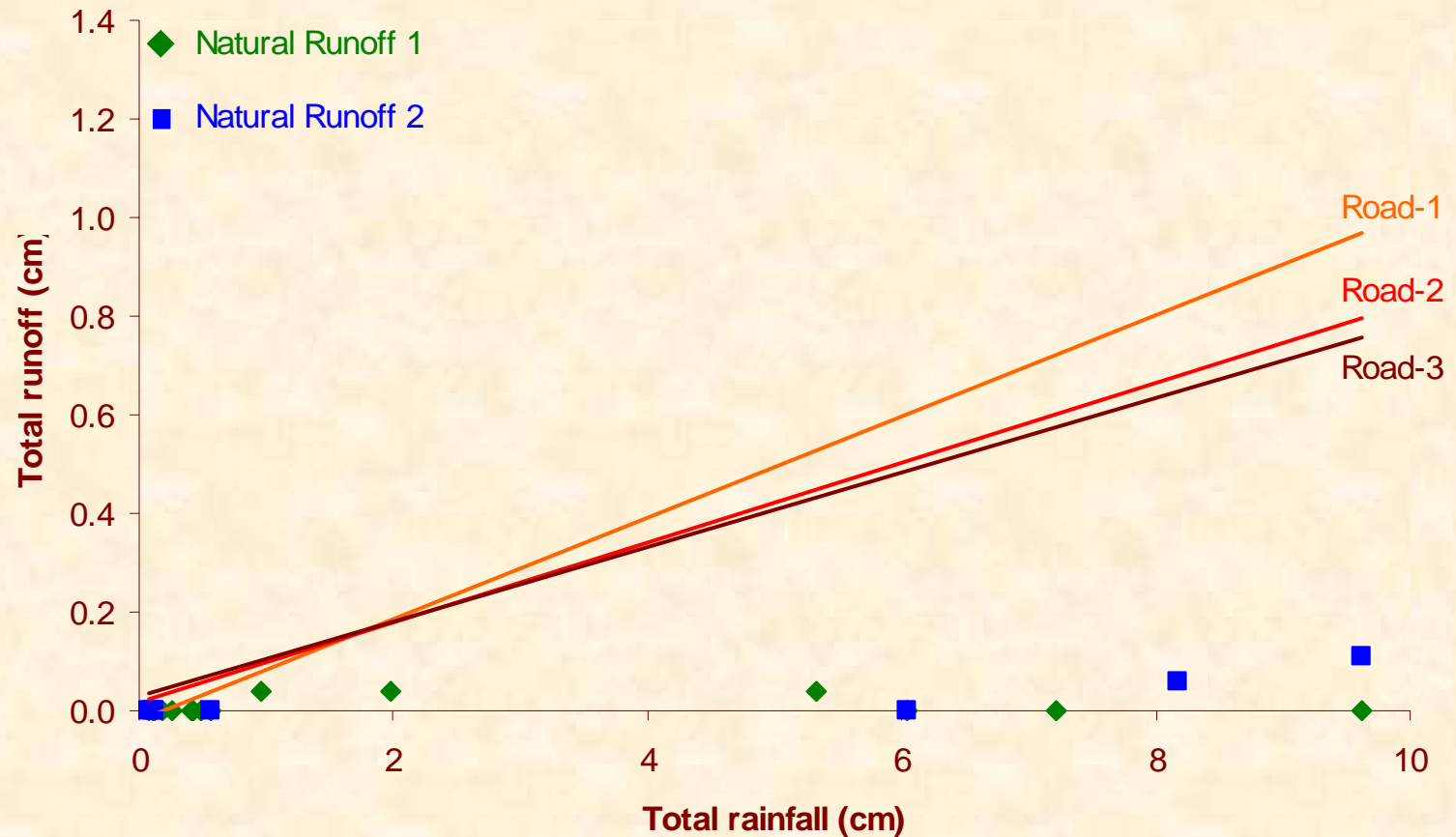
# Plot-scale runoff response measurements



# Plot-scale runoff response measurements



# Plot-scale runoff response measurements

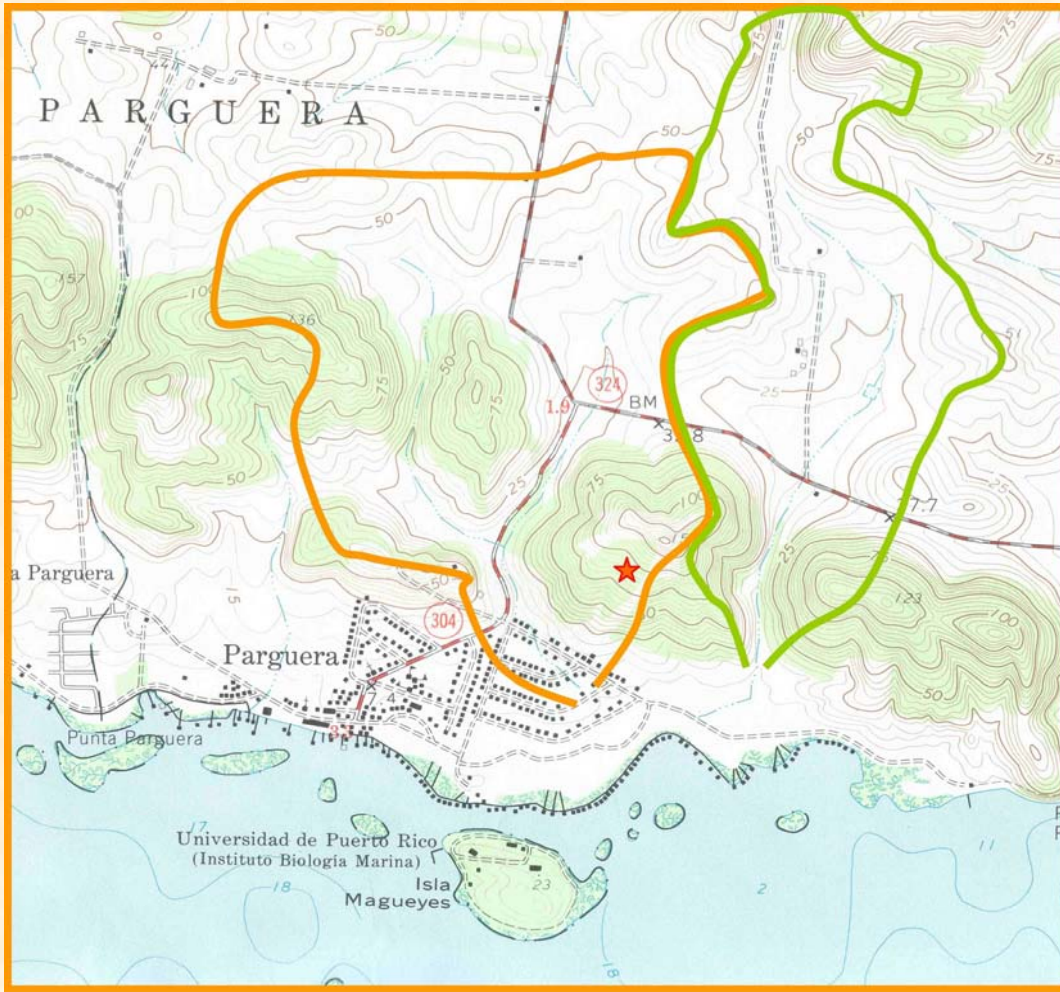


# Plot-scale runoff response measurements

	Road-1	Road-2	Road-3	Natural-1	Natural-2
Storm size threshold for runoff development (cm)	0.20	0.46	0.58	1.52	2.29
1-hr rainfall intensity threshold for runoff development (cm/hr)	0.20	0.56	0.56	1.22	1.73
Average runoff coefficient	9.0%	8.8%	6.3%	0.3%	0.7%

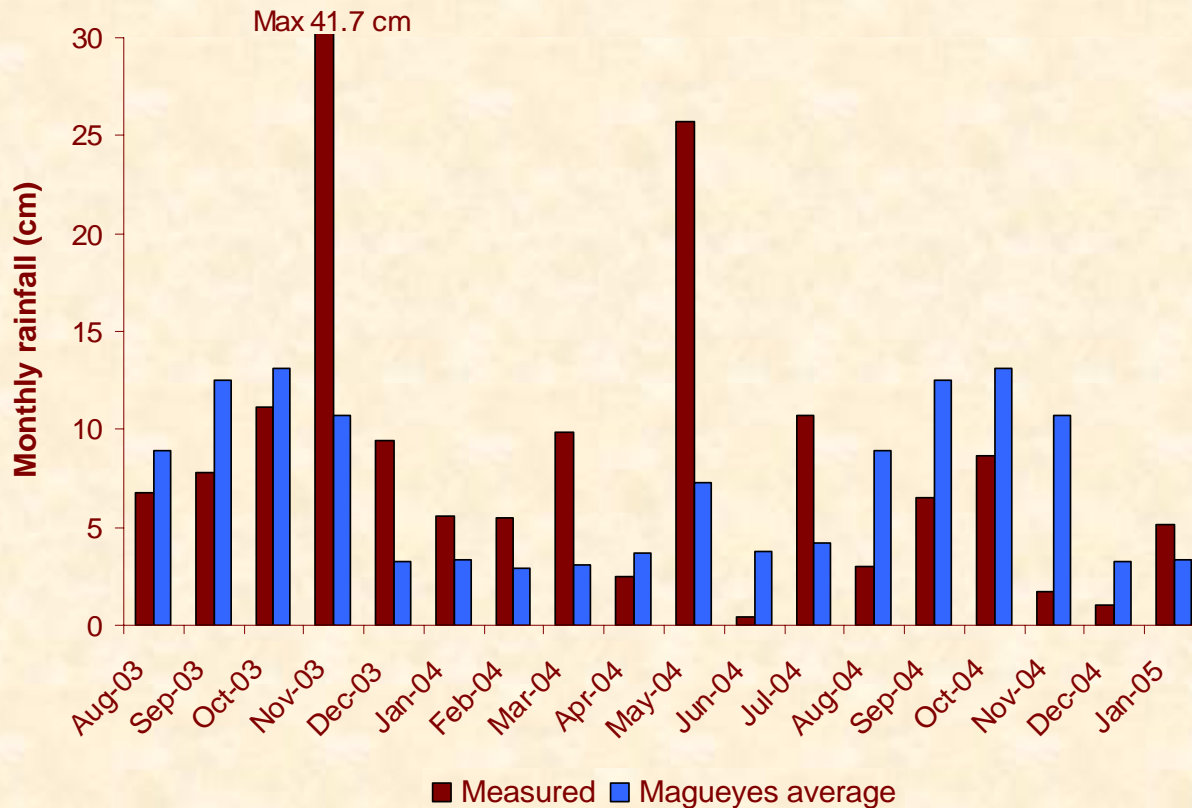
- Natural areas require 4-10 times more rainfall per storm event to generate runoff.
- Rainfall intensities needed to initiate runoff on natural areas are 3-6 times higher than on road surfaces.
- Runoff coefficients for road surfaces are over one-order of magnitude higher than on natural surfaces.

# Watershed-scale runoff measurements



- Quebrada Nautico Watershed
- Quebrada Poblado Watershed
- ★ Rain gage

# Watershed-scale runoff measurements

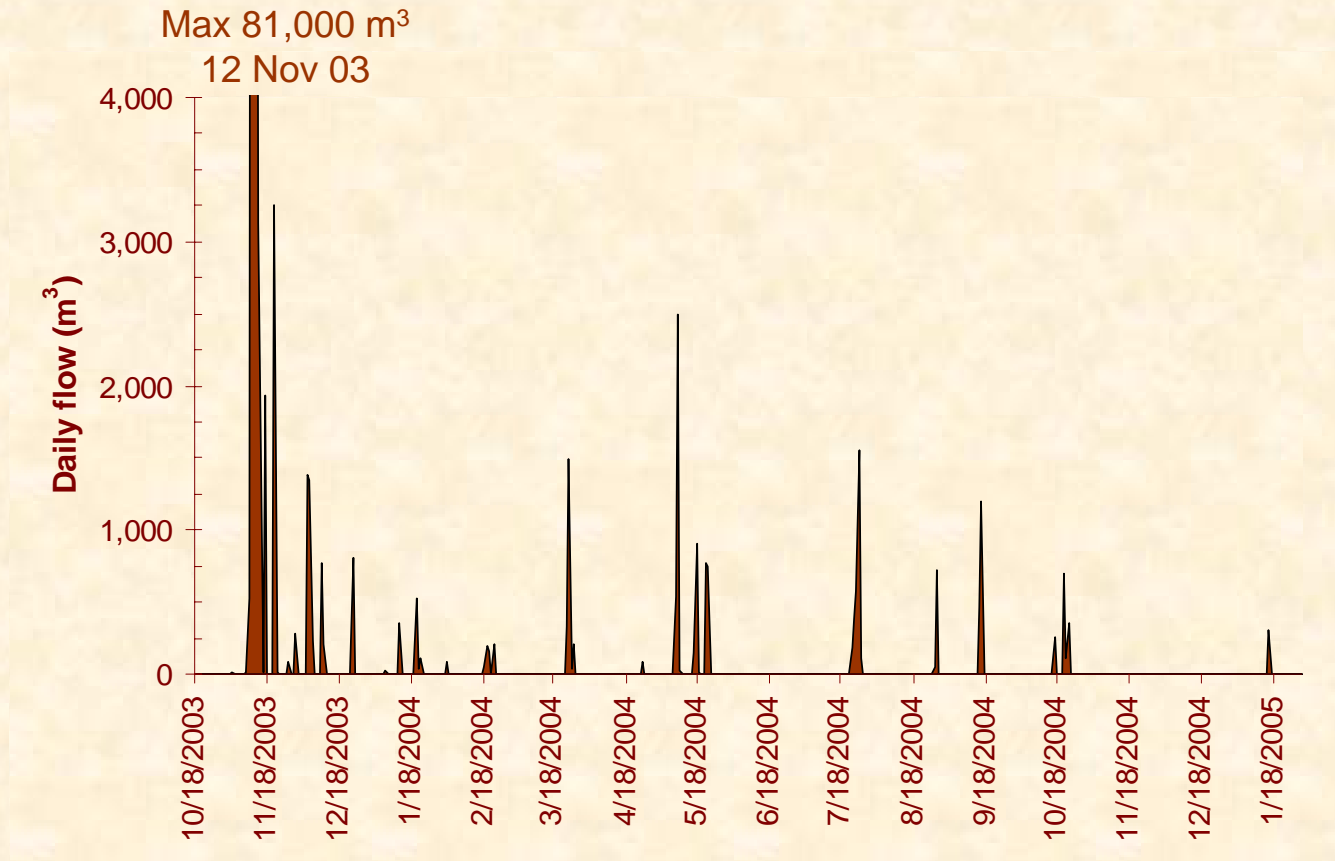


Since July-04 the total recorded rainfall has been only 65% of the Magueyes average.

The maximum 1-hr intensity recorded in the last seven months was only 2.4 cm/hr.

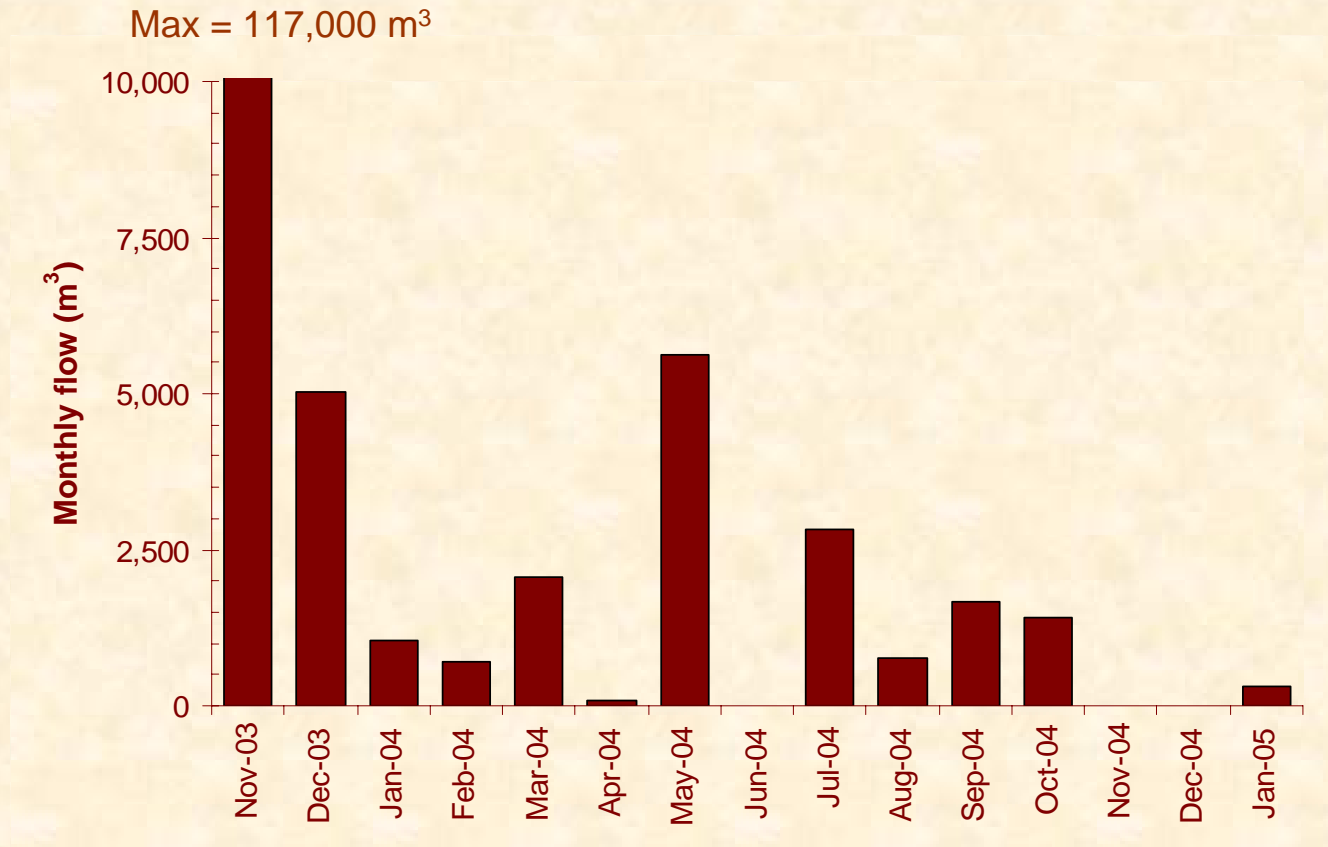
The low rainfall rates are responsible for the low sediment production rates recorded from the sediment traps, and the lack of any major runoff response at both the plot- and the watershed-scale.

# Watershed-scale runoff measurements



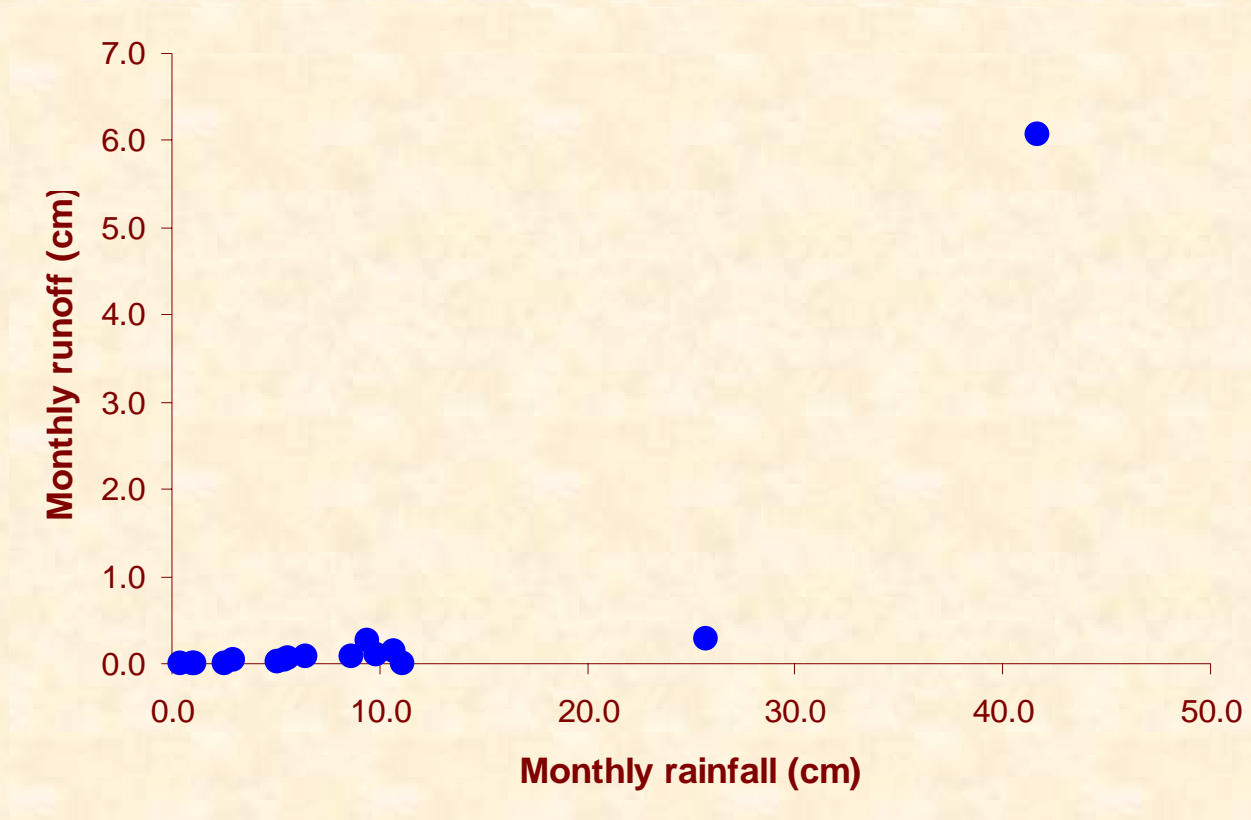
Queb. Poblado  
Preliminary data

# Watershed-scale runoff measurements



Queb. Poblado  
Preliminary data

# Watershed-scale runoff measurements



Queb. Poblado  
Preliminary data

Overall runoff  
coefficient = 5%

# Watershed-scale runoff measurements

- Relatively high quantities of runoff were delivered from the Quebrada Poblado watershed between Nov-03 and Dec-03.
- The delivery of runoff into La Parguera Bay from Quebrada Poblado between Jan-04 and Jan-05 has been minor and sporadic with only some significant delivery during May-04.
- Estimates of sediment loading rates are pending detailed revisions of the runoff data and laboratory analysis of water samples.

# Future work

1. From Now until June 2005:
  - a) Measurement of plot-scale runoff response once every two weeks.
  - b) Lab analysis of moisture content and particle size distribution of sediment samples collected from sediment traps.
  - c) Suspended sediment concentration of plot- and watershed-scale runoff samples.
2. Pending future funding:
  - a) Installation of additional runoff plots as these provide useful data even during periods with low intensity precipitation.
  - b) Continue monitoring sediment traps, runoff plots, and stream gauging stations after June 2005.